



Fermilab

**Particle Physics Division
Mechanical Department Engineering Note**

Number: MD-ENG-150

Date: 25 March 2008

Project Internal Reference: none

Project: 10 CRF 851 Implementation

Title: Report on the Pressure Vessel Task Team Meetings 3/18 and 3/19

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Reviewer(s): n/a

Key Words: 10 CRF 851 Pressure Safety Implementation Meeting.

Applicable Codes: ASME Section VIII, B31.3

Abstract Summary:

Tom Etheridge of ORNL initiated and hosted a meeting held at the Nevada Test Site Support Facility in Las Vegas NV on Tuesday March 18th and Wednesday March 19th 2008. The purpose of the meeting was to discuss the implementation of 10 CRF 851 for the DOE contractors. Gerald Meyers and Phil Wilhelm of DOE HQ-HSS were present (Mr. Meyers via the telephone and Mr. Wilhelm in person). The agenda and items for discussion are included below.

This engineering note is intended to share the author's observations of the meeting with other Fermilab staff.

OBSERVATIONS:

Site presentations were made by Oak Ridge National Laboratory (ORNL), Sandia National Laboratory (SNL), Brookhaven National Laboratory (BNL), Idaho National Laboratory (INL), Y-12, Lawrence Livermore National Laboratory (LLNL), Savannah River National Laboratory (SRNL) and Fermilab (FNAL). Los Alamos National Laboratory (LANL) did not present.

Based on these presentations and on the discussions, the following observations were made:

ORNL, Y-12, SRNL, INL and FNAL each has a mature program based on the ASME B31.3 (piping) and Section VIII (vessel) codes. Savannah River has a member on the Section VIII code committee (George Rawls). INL has ½ of an FTE devoted to pressure safety and the representative of INL concludes that this is too little.

ORNL, Y-12, and SRNL each have ASME code shops as part of their facilities. SRNL has a VR stamp for relief valves. They test every relief valve prior to installation and are authorized to adjust the set point.

BNL and LLNL have programs that do not make use of the national codes as a basis.

Based entirely on my interpretation of concerns voiced by the representative of LANL, LANL does not use the national codes as a basis for their pressure safety program and rejects any requirement to require pressure vessels to be code stamped.

Presentations by representatives from INL and SNL both mentioned the difficulty in controlling and documenting small gas bottle fed systems used by researchers in the laboratories. Both INL and SNL consider B31.3 to apply to these small systems. In response to a question from PNL (question 6 below), nearly all representatives agreed that the piping downstream of the regulator must either be protected by a pressure safety relief valve or designed for the full bottle pressure.

The FNAL presentation described the evaluations performed of the European Pressure Safety Directive (PED) and to of the standards that can be used to show conformance with the European Pressure Safety Directive (EN 13445 and AD 2000). ORNL described their changes to the worker safety plan which allows ORNL to accept vessel conforming to the PED. None of the other laboratories appear to be addressing this issue yet.

ISSUES:

- Wording in 10 CFR 851 requires the conformance with the 2004 version of the ASME boiler and pressure vessel code and attempt to require the DOE contractor to show that use of a later code does not reduce safety. This issue was discussed at length. Representatives of the laboratories with mature pressure safety programs based on the national standards agreed that the use of a later code should be accepted without justification. One suggestion it to task the DOE pressure safety committee with the job of reviewing new revisions of the codes and informing the ASME code committees if there is a change to the code that reduces safety as defined in 10 CFR 851. George Rawls (SRNL and member of the VIII code committee) indicated that it is never the intent of the code committees to reduce safety in the code revision.
- ASME B31.3 code for piping places responsibilities on the owner for piping systems. At SRNL, the contractor fulfills the owner's responsibilities; however, an auditor claims the DOE should be the 'owner'. It was concluded that the DOE is not staffed to perform these duties and that the DOE's operation and maintenance contractors should perform the owner's responsibilities as defined in B31.3. As and Action Item for the FNAL management, FRA should request from the local DOE site office, a memo instructing FRA to perform the owners duties with respect to ASME B31.3.
- FESHM 5033 uses a vacuum vessel size criteria of 35 cubic feet below which a vacuum vessel engineering note is not required. This size criterion is derived from the 75,000 ft-pounds (approximately 100 kJ) of stored energy used by LLNL and others. The source of this threshold is not known nor does it appear to be supported by any analysis. LANL uses a value of 20 kJ. PNNL uses 1000 ft-pounds

(1.3 kJ). LANL and PNNL do not draw a distinction between energy stored as a pressurized fluid or an evacuated volume. FNAL only uses the energy criteria for evacuated systems and not for pressurized systems.

- Two opposing opinions on whether or not 10 CFR 851 requires a code stamped pressure vessel were voiced at the meeting. Representatives from SRNL and ORNL opined it did. The representative from LANL indicated it doesn't. From a practical point, choosing to purchase a code stamped vessel allows one to meet the requirements of 10 CFR 851 at a lower cost compared to purchasing a non-stamped vessel and having to perform the work required in Appendix A to Part 851, under Pressure Safety paragraph (c.).

ATTENDEES:

Mark Cover – ORNL – Gave presentation
Dan Vetter – Idaho National Lab– Gave presentation
Dave Pushka – Fermi National Accelerator Laboratory – Gave Presentation.
Randy Eastman – Idaho Completion Project
Burt Kicker – Nevada Test Site - BRV inspector
Jennifer Macy – Nevada Test Site DOE Site Office
Charles White – Nevada Test Site DOE Site Office
Gregg Holtmeier – Lawrence Livermore National Lab (LLNL) – Gave presentation
George Rawls – Savannah River Site (SRS) and Section 8 code committee.
Tyler French – SRS – Gave Presentation.
Robert Bourke – Los Alamos National Lab (LANL)
Tobin Oruch - Los Alamos National Lab (LANL)
Tom Etheridge – ORNL – Chief Engineer – Host.
Mark Lower – ORNL – Gave Presentation
Steve Kane – BNL – Gave presentation
Roger Shrouf – Sandia, Gave presentation,
Phil Wilhelm – DOE HQ-HSS
Gerald Meyers – DOE HQ-HSS via telephone.
Brad Walker – Y-12 – gave presentation.
Kevin Carr – NNSA Albuquerque did not present any NNSA presentation.
Sam (via telephone) at PNL

AGENDA:

**Agenda for EPWOG Pressure Safety Task Team Meeting
Tuesday/Wednesday, March 18 and 19
DOE/NNSA Nevada Operations Office
Nevada Support Facility, 232 Energy Way
N. Las Vegas, Nevada**

Time (EST)	Day 1 March 18 Activities	Responsibility
0730	Assemble CDs of procedures, standards, training materials to share to Tobin Oruch <i>{If you have copies of Pressure Safety/Pressure Vessels Programs and/or procedures please bring copies on a CD. We will collect these and share with everyone. Tobin Oruch has agreed to serve as the meeting Secretary to keep us on track and organized.}</i>	All
0745	Introductions/Logistics	Tom Etheridge
Significant Topic Overviews		
0800	Pressure Safety Task Team Scope Discussion <i>{We will discuss the purpose and intent of the group getting together and formulate what we hope to accomplish. We'll also discuss the DOE Pressure Safety Committee and it's relationship to this group.}</i>	All
0900	General Overview of 10 CFR 851 <i>{In order to begin on common ground we will review exactly what 10 CFR 851 Appendix A Section 4 says, just the words not necessarily what we think it means. Hopefully we'll spend our time together concluding a common understanding of the Rule's intent.}</i>	Tom Etheridge/ Gerald Meyers
0930	Implementation Guide for Pressure System Safety as Specified in 10 CFR 851 <i>{Gerald provided us all a copy of the Implementation Guide.}</i>	Gerald Meyers
1000	Break	
1015	Identification / Listing of Issues <i>{A listing of the identified issues or questions we hope to answer will be listed and clarified. We will go through the list for identification purposes and discuss the issues during and after the 'Program Presentations' as applicable. Wednesday morning</i>	All

	<i>will be devoted to actual discussion of the issues/questions.}</i>	
1100	Pressure Safety Program Presentation #1 (Allow 30 minutes per site)	Site Reps
1130	Lunch (Cafeteria)	
1230	Pressure Safety Program Presentation #2	Site Reps
1300	Pressure Safety Program Presentation #3	Site Reps
1330	Pressure Safety Program Presentation #4	Site Reps
1400	Pressure Safety Program Presentation #5	Site Reps
1430	Break	Site Reps
1445	Pressure Safety Program Presentation #6	Site Reps
1515	Pressure Safety Program Presentation #7	Site Reps
1545	Pressure Safety Program Presentation #8	Site Reps
1615	Pressure Safety Program Presentation #9	Site Reps
1645	Pressure Safety Program Presentation #10	Site Reps
1715	Close-out/Adjourn	

Time (EST)	Day 2-March 19 Activities	Responsibility
0730	Assemble	All
0745	Re-cap March 18 Discussions	Tom Etheridge
0800	Roundtable Discussion of Issues <i>{We'll tackle the list of issues identified earlier and seek a consensus approach.}</i>	All
1000	Break	
1015	Roundtable Discussion of Issues	All
1100	Action Item Review	Tobin Oruch
1115	Next steps for Group	Tom Etheridge/ Gerald Meyers
1200	Adjourn	

Additional Notes:

As a reminder and point of clarification, you may not bring personally owned computers, camera capable cell phones or Blackberries into the facility we will be meeting in. You'll need to leave these type items in your car if you bring them.

You can bring non-camera cell phones, government computers and government PDAs (with a property pass from your site for computers/PDAs).

You need to bring your DOE issued badge to access the facility or pre-arrange your visit.

Pressure Safety Program Issues List

1. How are pressure relief devices dealt with for research systems? Specifically, how are relief devices on research equipment being tested or calibrated? We do not have funding allocated for this activity, so it has basically been overlooked in most cases. Who is paying for it on other sites? Who is performing the work? etc. (PNNL)
2. Is anyone replacing rupture disks on a schedule, or is it assumed they have an infinite shelf life? Is there a standard industrial practice? A good example of this issue is for liquid nitrogen dewars that have been in service for 20+ years. Their relief device is often original to the dewar. (PNNL)
3. One major topic hasn't been addressed clearly is the all encompassing scope of 10CFR851. There is no limit on pressure or hazard associated with pressure. Part C of the rule clearly invokes any item that is under pressure and the definition includes anything that could possibly become pressurized (backfill for vacuum systems). Inevitably somebody's going to ask if their pop can is a pressure vessel and presents a pressure safety hazard. We have tried to set a limit for items that we will consider a hazard based upon stored energy. Lawrence Livermore does a similar thing and has a stored energy limit of 75000 ft-lbf (I believe). PNNL has a stored energy limit of 1000 ft-lbf before we consider the system a pressurized hazard (When I last looked Idaho NL basically had a copy of our procedure). Our number has no analytical basis. It apparently is equivalent of 1/3 grams of TNT. We do have first hand knowledge that at about 15 psi (accidentally pressurized due to clogged vent) a 5 gallon fermentor exploded a few years back (stored energy of ~ 1300 ft-lbf). It was a catastrophic event, and if someone would have been in the lab, would have definitely been hurt, possibly worse. (PNNL)
4. Is there a consensus on what constitutes a pressure hazard? This could even be dependent upon material type. (PNNL)
5. The idea of an FTP site for all of our program descriptions, procedures, and/or manuals is appealing. It would be beneficial if each site could put together a flow chart or power point stating the major points of each program. (PNNL)
6. Someone brought up the use of compressed gas systems and how it was felt this constituted a majority of the research systems. A similar situation exists at PNNL. Do sites/industry allow the use of one pressure regulator as the pressure safety device? Can dual regulators be used (assuming that a double failure is not a credible event)? Are all systems downstream of the regulators designed for the maximum bottle pressure or the maximum regulator outlet pressure? (PNNL)
7. What versions of codes and standards are enforceable under 10 CFR 851, particularly as related to those standards that have specific dates associated with

them in the rule (e.g., the pressure safety standards listed in 10 CFR 851.27 and Appendix A, Section 4 of the rule)? (Group)

Response from Kathy McCarty referencing text from the preamble to the final rule (page 6896 of the applicable Federal Register notice), especially the second to last sentence: "Regulatory requirements must be specific and include the editions of incorporated standards. Therefore, DOE cannot accept the suggestion of requiring compliance with the "latest revision" of standards that are incorporated by reference. However, DOE has reviewed the standards listed in section 851.23(a) to determine if they are appropriate. As a result of this review, DOE has eliminated from the final rule many of the consensus standards that were listed in the supplemental proposal. The standards included in this final rule are consistent with those mandated under DOE Order 440.1A. While contractors must meet the standards listed in section 851.23(a), they are free to comply with more recent editions of the standards as long as the provisions of the more recent standards are at least protective as the edition specified in the final rule. In future rulemakings, DOE will consider the need for updating the referenced standards."

Further, Kathy provided "This approach is reiterated on page 55 of DOE G 440.1-8, which states: "Contractors may include successor versions of the consensus standards that provide equal or greater worker protection if included in their DOE-approved worker safety and health program."

HSS expects contractors to identify the specific version/edition (e.g., by date) of consensus codes and standards that they are working to in their DOE-approved Worker Safety and Health Programs (WSHP). I have also asked the Office of General Counsel which version of a standard we can enforce under 10 CFR 851 if the standard is dated in the rule and a contractor has elected to apply a later version of the standard as reflected in their WSHP. The answer is that we can enforce either or both using our discretion. In that case, contractors should assume that we would enforce against the more restrictive of the two standards provided that it is clear which is more restrictive. If the case is not clear, we will use our discretion and judgment, and take a common sense approach, in determining the appropriate standard to use as the basis for any enforcement action.

8. Does 10 CFR 851 require pressure vessels to be code stamped? (LANL)
9. How is quality assurance handled in terms of "ensuring" that PV/S's (pressure vessel/pressure vessel systems) are meeting the requirements of 10CFR851? In terms of "Say it, Do it, Prove it", how is drafting, quality assurance, and design documentation controlled? [The way we prove to the auditors that our systems are "safe", is by providing the auditors a paper trail. In other words, if we don't know the configuration of our systems, then we have no proof (ensuring) of their safety and design compliance.] How is the configuration control (QA) process handled? (LANL)

10. How everyone is tackling the efforts at their own sites to track and identify all of their pressure systems (not vessels or relief devices - entire pressure systems). Do they maintain pressure systems inventory or only vessel/prv inventory's and if only vessel and PRV inventory's, why. If entire pressure systems are tracked, what specific items in the pressure systems are reviewed? (LANL)
11. How everyone's performing their own internal audits of their pressure systems to ensure that they are all built and maintained to comply with ASME Code? How often do they perform these audits? What do they do if they find a problem with a pressure system (shut it down? Fire the owner?). What specific details about their pressure systems are reviewed and scrutinized (paper trail, PRV flow checks, PRV vs. source pressure vs. component MAWPs). (LANL)
12. What levels of authorization is everyone using at each site to allow a pressure system to be pressurized in the first place? Is any design authority required to sign off on pressure system designs prior to them being activated? (LANL)
13. How is the "Code of Record" determined and maintained for Pressure Systems? (Y-12)
14. How is "equivalent protection" determined under 10 CFR 851 Appendix A Section 4.c? (Y-12)
15. How can we help experimenters having pressure systems do their job safely and efficiently with a minimum of encumbrances? How can we provide the technical support they need in a cooperative manner? (LANL)
16. Which compliance rules, especially documentation, are really needed to satisfy 10CFR851 and which are institutional add-ons that decrease one's ability to do the job without adding to safety, or add to safety only marginally but at considerable expense? (LANL)
17. How are the ASME B31.3 Owner responsibilities being fulfilled at other facilities? (SRS)
18. How are windows or other fracture critical/brittle materials addressed in other sites pressure systems? What safety factor is used for design and pressure testing? (LLNL)
19. Do other sites do their own certification of non-modified commercial high pressure lines such as helium lines on a cryopump or do they accept the vendor's certification? (LLNL)
20. Do other sites certify or retest relief devices on commercial liquid nitrogen tanks? (LLNL)

21. What pressure safety training is included as part of your site's Pressure Safety Program? (ORNL)